

# Edible Coatings May Boost Food Safety

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MONDAY, Nov. 27 (HealthDay News) -- A natural, edible coating could help keep deadly *E. coli* bacteria and other nasty bugs away from fresh produce, U.S. government scientists report.

Researchers at the U.S. Department of Agriculture say the new compounds reduce the risk of infection from deadly *E. coli* O157:H7 bacteria and other foodborne microorganisms. They report their findings in the Nov. 29 issue of the *Journal of Food and Agricultural Chemistry*.

"We hope that these coatings will have wide commercial potential," said Tara McHugh, a food chemist with the U.S. Department of Agriculture's Agricultural Service in Albany, Calif. Her team conducted lab tests on the *E. coli*-inhibiting ability of apple-puree food coatings containing one of three natural antimicrobial compounds: oregano, lemongrass and cinnamon oil.

The researchers say the oregano oil coating was the most effective, killing more than 50 percent of *E. coli* O157:H7 bacteria within three minutes.

Because such coatings contain sticky sugars and fats, they may adhere longer to fresh produce and provide a more concentrated, longer-lasting method for killing bacteria than conventional, water-based washes, McHugh said.

That would be welcome news to consumers who have been

bombarded with reports this fall about food safety, starting with the *E. coli* O157:H7 scare in mid-September that killed three Americans and sickened nearly 200 others who ate tainted spinach.

Subsequent scares included a salmonella outbreak that sickened 171 people in 19 states, plus recalls of *E. coli*-tainted lettuce and ground beef. And on Monday, officials at the USDA announced that a type of salmonella typically found in eggs is turning up with increasing frequency in chicken meat.

But some scientists wonder if edible coatings with antimicrobial compounds will prove practical in improving food safety outside of the laboratory.

"They haven't yet been tested in the real world, which means they need to be tested on fresh fruits and vegetables. So we don't know how efficacious they would really be," said Dr. Pascal James Imperato, chairman of the department of preventive medicine and community health at the State University of New York Downstate Medical Center, and a former New York City health commissioner.

"When produce is shipped, it undergoes a great deal of handling and exposure to many different temperature environments," Imperato said. "For this to have commercial applications, it would have to undergo much more stringent scientific study."

Food allergy is another possible complication, Imperato said. "Suppose you have someone who's allergic to oregano? I would view this study as showing interesting preliminary scientific results that would have to be corroborated by other scientists before these coatings are adopted by the commercial fresh produce industry."

Because *E. coli* and other microorganisms can lurk anywhere on the surface -- or even the interior -- of fresh produce, it's possible that the coatings might not affect them all, said Arun Bhunia, professor of

food microbiology at the Purdue University department of food science in West Lafayette, Ind.

"My concern is that only a small portion of the food would be in direct contact with the film," Bhunia said. "How can it be assured that the entire content of a package would be exposed to the antimicrobial agent and thus provide safety? How stable is this compound, and how long would it maintain its activity? It also appears that the researchers have not tested many strains of *E. coli* O157:H7 to assess overall efficacy."

"This is the beginning of a three-year project," McHugh said. "We'll be testing a wide range of natural compounds, not just against *E. coli* but also against listeria and salmonella. The ones that are shown to be effective will be tested directly on produce and meat products. We need to find out if these compounds are active against bacteria that adhere in different ways to different foods."

"But, at this point, it looks promising," McHugh said. If the new research continues to show promise, she predicted that edible, antimicrobial coatings could find commercial application within a year or two.

Edible food coatings without antimicrobial activity have already been used commercially because they help prevent spoilage, she noted.

The USDA's commercial partner, Origami Foods, has used apple puree coatings on hams, and has used and carrot- and tomato-based films on sushi, she said. In addition, restaurant chefs have used both fruit- and vegetable-based coatings on everything from appetizers to main courses and desserts.

"We very much want to transfer the technologies we develop into commercialization, but we can only do that through partnerships with other companies," McHugh said. "Some of the reasons we at USDA

are interested in this research is to help growers get more value from their fruits and vegetables, and also to help consumers eat more fruits and vegetables."

### **More information**

For more on safe food handling, visit the [U.S. Department of Agriculture](#).

SOURCES: Tara McHugh, Ph.D., food chemist, USDA Agricultural Service, Albany, Calif; Pascal James Imperato, M.D., chairman, department of preventive medicine and community health, State University of New York Downstate Medical Center, New York City, and former New York City Health Commissioner; Arun Bhunia, Ph.D., professor, food microbiology, Purdue University, West Lafayette, Ind.; Nov. 29, 2006, Journal of Agricultural and Food Chemistry